

REGISTRATION UNITField of the Invention

The present invention relates to a registration unit intended for wireless communication with an information carrier, such as a transponder, and comprising a mobile unit. The invention further relates to a registration module for wireless communication with an information carrier, said module being connectible with another mobile unit.

Background Art

In mobile identification equipment, size is an essential factor, and it is desirable to reduce the size of the units included as much as possible. Identification equipment available today usually comprise a hand-held computer with an accessory module for wireless communication between the identification unit and an information carrier, such as a transponder. As a result, they will be large and unwieldy and not ergonomically designed. The accessory modules usually have a separate plastic casing which must be adapted to each hand-held computer and be attached to the same.

A further problem of today's identification equipment is that it is often necessary for the hand-held computer to participate in the identification process. For example, lists of approved transponders must be stored and searched in the hand-held computer. This results in the hand-held computer being prevented from performing other tasks during identification.

Moreover, separate output ports of the hand-held computer are normally required to allow the accessory module to be connected. As a rule, a serial interface and an RS232 plug are used.

Object of the Invention

An object of the present invention therefore is to provide a registration unit which makes it possible to read and write information to/from data carriers with both simple and advanced mobile equipment, and which wholly, or at least partly, solves the above problems of prior-art technique.

This object is achieved by a registration unit and a registration module according to the appended claims.

By means of the registration unit and the registration module according to the invention, a combination of wireless identification with the aid of RFID (Radio Frequency IDentification) and a bar code will now be possible without necessitating reading of one at a time and changing of the accessory module between readings, which is necessary in currently used equipment. Thus, simultaneous reading of, for instance, transponders and bar codes can be effected by arranging a registration unit according to the invention in the space for memory expansion of a hand-held computer equipped for bar code reading. Besides, most hand-held computers have two internal spaces for an additional memory, one space being usable to receive a registration module while the other can be used to receive an additional memory unit.

By arranging the registration module in the space for memory expansion of the mobile processing unit, the size of the registration unit will be minimised. Moreover, the connection of the registration module can be made simple by the ports that are intended for the additional memory being used for communication between the registration module and the processing unit.

It is also an advantage of the invention that it enables integration of the hand-held computer and the registration module, which in turn renders it possible to avoid or minimise the need for cabling, which increases the reliability of the system. Safe identification by means of transponders will thus be possible

with mobile equipment, which was previously difficult to perform owing to size, price, unwieldy shape and functionality.

5 Brief Description of the Drawings

The invention will be described below in more detail by way of an embodiment and with reference to the accompanying drawing, which in a block diagram schematically shows a system with a registration module designed according to the invention.

Description of Preferred Embodiments

The registration unit according to the invention suitably comprises a registration module 12 of RFID type, i.e. Radio Frequency IDentification. With the aid of this module, a reading/writing function is obtained for data carriers (e.g. transponders) with mobile units such as hand-held computers. The registration module, however, can also be adapted to other forms of wireless communication by means of radio waves. Preferably, however, it is adapted to communicate with an information carrier 10 which consists of a mobile unit which can store information and preferably which consists of a passive unit operated by energy which is transmitted in a wireless manner by the registration unit. It is also possible to employ information carriers using a battery or other internal energy sources within the scope of the invention.

The RFID module is adapted to be connected to a hand-held mobile unit 11 (e.g. a computer, a telephone or a combination thereof), which can accommodate at least one additional memory module. The registration module thus provides the mobile unit 11 with a reading/writing function for exchange of information to/from data carriers (e.g. transponders) in a contactless manner by means of radio waves (e.g. RFID technique).

The RFID module is intended for use inside the mobile unit and is preferably formed as a small but thick credit card which is inserted into the mobile unit, such as a hand-held computer. Consequently, the RFID module will not be visible in normal use and thus does not affect the total size of the registration unit.

The RFID module is preferably connected to the connections that are intended for memory expansion to establish communication between the registration module and the mobile unit. Moreover, the power supply of the module is preferably obtained via the same connecting means which provides communication to the hand-held computer/mobile unit and which is, for example, a 6-pole connector. Preferably, the registration module emulates a memory to the processing unit, which will see the registration module as an additional memory and also communicate with the same as if it were a conventional memory.

A casing for the registration module is suitably made of, for instance, plastic. The dimensions may vary but the casing can advantageously be designed as, for instance, SSD (Solid State Disk) memories, the size of which is 64*42*6mm, or as compact flash memories which are a standard for memory modules in hand-held units.

The RFID module may comprise, for example, an aerial or antenna 13, a radio communication part 14 for receiving and transmitting radio signals and a converting unit 15 to enable communication between the radio communication part and the processing unit 11. The aerial 13 can be used to receive and transmit radio waves and thus serves as an interface against the information carriers 10. The radio communication part can be, for example, a passive part, such as an RFID chip, which is used to control the aerial and/or to generate signals to the aerial. The converting unit 15 preferably comprises a one-chip computer or the like as well as a converting part. The one-chip computer is the active part which controls the radio communication part so that the correct

function is achieved. The converting part can be a stand-alone part or be included as part of the one-chip computer and serves to adapt the output signal from the one-chip computer to the surroundings, for example to emulate a RAM memory (Random Access Memory). All the parts included in the RFID module can advantageously be arranged, and preferably soldered, on a common printed board. The RFID module further comprises preferably at least one connecting means to physically connect the module to the processing unit for transmitting signals therebetween. The parts included in the RFID module can also be combined to one or more chips having similar functions.

The module can also be supplemented with memory modules to obtain a combined smart unit, which, for instance, can store information about which transponders are approved in the specific application and only inform the hand-held computer when an approved (according to numbers stored) transponder is available in the reading area of the module, the transponder communicating with the hand-held computer via the module, for identification, logging of number, time and date, whereupon the hand-held computer can take a preprogrammed action if any. This can also be an electricity-saving function towards the battery supply of the hand-held computer since the RFID module takes care of the decoding even before the hand-held computer would otherwise have received the transponder number, which promotes a faster process and simpler and faster software in the hand-held computer/ mobile unit. Rapidity is an important aspect of hand-held computers, and if the check of the transponder number is handled in the RFID module, a larger processor capacity for the actual application in the hand-held computer is made available.

The registration module described above can be used in many fields: for instance, marking in service, industry; passage control of pallets, hoists, robots, machi-

nery, animals, departing/arriving goods; stock-handling, charging; identification at predetermined locations for reading of metering points, e.g. water, electricity, gas, oil, pressure, flow rate and registration of measured values. Additional fields of application are messengers for delivering documents and parcels, identification and registration of mud collectors, lorry weighers, computers, tarpaulins, tents, canoes, pallets (wood and metal), paintings, trees, mobile phones etc. Furthermore the invention can be used by real-estate security officers for confirmation of attendance.

The invention is not limited to the above embodiments, and several variants are conceivable within the scope of the appended claims. For example, the module can be provided with a memory.

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